

REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. § 1.116 AND
SUBMISSION OF EXECUTED DECLARATION UNDER 37 C.F.R. §1.131
U.S. Appln. No. 10/633,670
Attorney Docket No.: Q76738

That is, Applicant submits herewith a copy of an executed Declaration Under 37 C.F.R. §1.131 signed by Yusuke ISHIHARA, Hideaki SHIGA and Kiyoo MORITA, establishing earlier date of invention than the § 102(a) date of the Morita reference (Morita published on May 22, 2001)¹. As evidence of the prior invention, Applicant submits herewith a verified English translation of Japanese Patent Application No. 11-59818. The filing date of Japanese Patent Application No. 11-59818 is March 8, 1999, which predates the § 102(a) date of Morita.

Consequently, Morita does not qualify as prior art under 35 U.S.C. § 102(a). Accordingly, Morita is removed as a prior art reference under 35 U.S.C. § 103(c) in view of a common assignment. As a result, Applicant respectfully requests the Examiner to withdraw the rejection of claims 2 and 3 in view of Morita.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

¹ The foreign priority documents of Morita also published after the date of invention of the above identified application, as evidenced by the Declaration under 1.131 submitted herewith.

REQUEST FOR RECONSIDERATION UNDER 37 C.F.R. § 1.116 AND
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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: September 23, 2005

Ruthleen E. Uy
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Enclosures: (1) executed Declaration under 37 C.F.R. § 1.131
(2) verified English translation of JP Patent Application No. 11-59818



PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q76738

Yusuke ISHIHARA, et al.

Appln. No.: 10/633,670

Group Art Unit: 3654

Confirmation No.: 5324

Examiner: John Quoc NGUYEN

Filed: August 05, 2003

For: MAGNETIC TAPE CARTRIDGE

DECLARATION UNDER 37 C.F.R. §1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

We, Yusuke Ishihara, Hideaki Shiga, Kiyoo Morita, hereby separately declare and state:

THAT we are citizens of Japan (a WTO country), and are joint inventors of an invention entitled MAGNETIC TAPE CARTRIDGE, which is disclosed and claimed in the above referenced U.S. Patent Application No. 10/633,670 (hereinafter "'670 application").

THAT we are employed by Fuji Photo Film, Co., Ltd., a corporation of Japan and the assignee of the above referenced application by virtue of an assignment recorded in the U.S. Patent and Trademark Office at reel 012380, frame 0288 on December 5, 2001.

THAT in an Office Action mailed November 23, 2004, the Examiner applied as a reference against claims 2 and 3 of the '670 application, U.S. Patent No. 6,236,539 granted to Morita et al. (hereinafter "Morita").

THAT claims 2 and 3 are rejected as being unpatentable over Morita.

THAT in the Amendment Under 37 C.F.R. § 1.116 filed on May 23, 2005, Morita was removed as a reference under common obligation of assignment.

THAT we invented the subject matter of claims 2 and 3 of the present application, as early as March 8, 1999. As evidence, we rely on the following exhibit, which is described below in more detail:

Exhibit A: A copy of a verified English translation of Japanese Application No. 11-59818.

Exhibit A is a copy of a verified English translation of Japanese Application No. 11-59818 filed on March 8, 1999. Exhibit A discloses the subject matter of rejected claims 2 and 3, and proves that we invented the subject matter of claims 2 and 3 no later than March 8, 1999.

The support for each of the claims can be found in Exhibit A. For example, claims 1 and 2 of Exhibit A correspond to claims 2 and 3 of the present application. The locations are representative only, and further support for the claimed subject matter may be found at other locations in Application No. 11-59818. Further, we diligently worked towards the filing of the application in the United States.

In view of the foregoing, it is clear that we, the named inventors of the present '670 application, invented the subject matter of claims 2 and 3 prior to the publication dates of the priority documents (JP 9-354644 and JP 10-118660) identified in Morita.

We declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States

Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: September 22, 2005

Yusuke Ishihara

Yusuke Ishihara
Fuji Photo Film, Co., Ltd.

Date: September 22, 2005

Hideaki Shiga

Hideaki Shiga
Fuji Photo Film, Co., Ltd.

Date: September 22, 2005

Kiyoo Morita

Kiyoo Morita
Fuji Photo Film, Co., Ltd.

DECLARATION

I, Mayumi Takano, of Yanagida & Associates, 7F Shin-Yokohama KS Bldg., 3-18-3 Shin-Yokohama, Kohoku-ku, Yokohama-shi, Japan, hereby certify that I understand both English and Japanese, that the translation is true and correct, and that all statements are being made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Mayumi Takano

Mayumi Takano

Dated this 6th day of September, 2005

[Name of Document] SPECIFICATION

[Title of Invention] Magnetic Tape Cartridge

[Scope of Demand for Patent]

1. A magnetic tape cartridge comprising:

5 a single reel with magnetic tape wound thereon;

a cartridge case, which comprises a lower case and an upper case stacked atop the lower case, for rotatably housing said single reel;

10 a leader pin affixed to a leading end of said magnetic tape to pull said magnetic tape out of said cartridge case; and

a lock member, formed from a plate spring, for detachably locking and holding an upper end portion and a lower end portion of said leader pin;

15 wherein said lock member comprises a plate-shaped mounting portion which is held by said upper and lower cases, and elastic arm portions extending from said mounting portion toward said leader pin, the upper and lower pin-locking portions of the elastic arms being engageable with said leader pin at said upper and lower end portions of the leader pin side of said
20 mounting portion;

and wherein an interior angle that said mounting portion forms with said elastic arm portion is an obtuse angle.

2. The magnetic tape cartridge as set forth in claim 1, wherein said interior angle that said mounting portion forms
25 with said elastic arm portion is 135° or greater.

3. A magnetic tape cartridge comprising:

a single reel with magnetic tape wound thereon;

a cartridge case, which comprises a lower case and an upper case stacked atop said lower case, for rotatably housing said single reel;

5 a leader pin affixed to a leading end of said magnetic tape to pull said magnetic tape out of said cartridge case; and

a lock member, formed from a plate spring, for detachably locking and holding an upper end portion and a lower end portion of said leader pin;

10 wherein said lock member comprises a plate-shaped mounting portion which is held by said upper and lower cases, and elastic arm portions extending from said mounting portion toward said leader pin, the upper and lower pin-locking portions of the elastic arms being engageable with said leader pin at
15 said upper and lower end portions of the leader pin side of said mounting portion;

and wherein upper and lower lock-member installing portions for holding said lock member are provided in said cartridge case and said upper and lower lock-member installing
20 portions hold said lock member at positions 0.4 mm or greater away from side walls of said lower and upper cases.

4. The magnetic tape cartridge as set forth in claim 3, wherein

the mounting portion of said lock member has upper and
25 lower engagement recesses at upper and lower edges thereof;

said upper and lower lock-member installing portions

have upper and lower protrusions; and

said lock member is positioned and held by fitting said upper and lower protrusions into said upper and lower engagement recesses.

5

5. The magnetic tape cartridge as set forth in claim 3, wherein said upper and lower lock-member installing portions of said cartridge case has a tilt regulating portion for holding an edge, opposite from said elastic arm portions, of said mounting portion of said lock member in an erect posture.

10

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a magnetic tape cartridge,
5 in which a single tape reel with magnetic tape wound thereon
is rotatably housed within a cartridge case, and in which a leader
pin for pulling the magnetic tape out of the cartridge case is
affixed to the leading end of the magnetic tape, and particularly
relates to a lock member for detachably holding said leader pin
10 and its mounting structure.

[0002]

[Description of the Related Art]

In existing magnetic tape cartridges, which are being used
as storage media employed in external storage units for computers,
15 etc., there is known a type where a single reel with magnetic
tape wound thereon is rotatably housed within a cartridge case.
This magnetic tape is employed to archive data for computers,
etc. Since important information has been stored, the magnetic
cartridge is constructed so that problems, such as tape jamming,
20 etc., do not occur and that the magnetic tape is not pulled out
of the cartridge case unexpectedly.

[0003]

Also, a leader member (a leader pin in the present invention)
is affixed to the leading end portion of the magnetic tape. This
25 leader member is held and pulled out of a drive unit provided
on the side of a computer, whereby forward winding or reverse

winding of the magnetic tape is performed. The aforementioned leader member is detachably held in the cartridge case, and it is advantageous from the viewpoint of structural simplification to employ a spring member to hold the leader member.

5 [0004]

[Problems to be solved by the Invention]

Therefore, if there is provided a lock member with integral upper and lower hold portions which abut the upper and lower ends of the leader pin, the assembly characteristics of the leader pin to the upper and lower cases of the magnetic tape cartridge will be enhanced. However, in forming the lock member by stamping and bending a plate spring by press operations, the manufacturing precision is reduced depending on the configuration of the lock member and there is a problem that the holding force of the lock member with respect to the leader pin will vary.

[0005]

For example, consider a lock member manufactured by pressing a plate spring such as that shown in Figs. 12 and 13. In Fig. 12, a leader pin 5 affixed to the leading end of magnetic tape 6 is pulled in and out through an opening 10 formed in the side surfaces of a lower case 3 (the same shall apply to an upper case) of a cartridge case 4. Inside the opening 10, upper and lower housing recesses 20 are formed at the upper and lower wall surface and the upper and lower end portions of the leader pin 5 are held in the housing recesses 20. Also, a tapered lower guide portion 21 is provided from the lower housing recess 20 toward

the opening 10. A lock member 50, for detachably holding the leader pin 5 in the housing recesses 20, is symmetrical in the vertical direction thereof and formed into a generally U-shape, as shown in Fig. 13. The lock member 50 has a mounting portion 50a, which is clamped between a mounting boss 51 erected in the bottom surface of the lower case 3 and the side wall 3b of the lower case 3, along the side wall 3b. The lock member 50 also has upper and lower elastic arm portions 50b, 50b extending from the forwardly curved rear portion of the mounting portion 50a toward the opening 10. The elastic arm portions 50b, 50b have leader-pin holding portions 50c, 50c at their outer ends, respectively. The leader-pin holding portions 50c, 50c abut the upper and lower end portions of the leader pin 5, respectively. Each leader-pin holding portion 50 is bent and has an outer inclined surface which is contacted and deformed by the leader pin 5 being inserted through the opening 10, and an inner inclined surface with which the leader pin 5 is pressed against and held in the housing recess 20.

[0006]

The aforementioned lock member 50 is bent into a deeply curved U-shape by pressing a plate spring, so it is difficult to accurately form an angle α (see Fig. 13) which the mounting portion 50a forms with the elastic arm portion 50b. The amount of deformation in pressing and holding the leader pin 5 varies and therefore the holding force of the lock member 50 with respect to the leader pin 5 tends to vary. In addition, the deep U-shape pressing

requires a plurality of press operations and increases the number of manufacturing steps. Since the deep U-shape pressing makes the length of the elastic arm portion 50b longer and thus increases the developed area, a large quantity of plate spring material is discarded after the stamping operation. Thus, the deeply U-shaped lock member 50 is disadvantageous in terms of cost. Furthermore, when a large number of lock members 50 are stored, they are stacked and engaged with one another, if each lock member 50 has a deeply curved U-shape. Since it is difficult to separate them from each other, there is the problem that feeding them serially by a part feeder may become difficult.

[0007]

On the other hand, in the mounting structure of the lock member 50 in the cartridge case 4, in which the plate-shaped mounting portion 50a of the lock member 50 is disposed along the side wall 3b of the lower case 3 and clamped between the side wall 3b and the mounting boss 51, that part of the metal mold which molds the gap between the mounting boss 51 and the side wall 3b will become very thin, if the lock member 50 is made thin in order to obtain proper leader-pin holding force. Because of this, there is a possibility that the thickness-reduced part of the metal mold will be damaged by pressure produced when resin is injected. It is also difficult to manufacture a metal mold having thin portions. Particularly, when the mounting boss 51 is formed high, or long along the side wall 3b, the aforementioned phenomenon becomes conspicuous.

[0008]

Furthermore, when the plate-shaped lock member 50 is assembled into the cartridge case 4, depending on the locking structure there is a possibility that the upper case cannot be closed to the lower case 3. That is, when the lock member 50 is set to the lower case 3, and the upper case is stacked on the lower case 3, the lock member 50 tilts and cannot engage with the mounting boss 51 of the upper case and abut the lower end of the mounting boss 51, and therefore the upper case cannot be closed.

Particularly, a space is required around the leader pin 5 so that a leader-pin pulling-out mechanism of a drive unit can enter through the opening 10 and hold the leader pin 5. The mounting boss 51 needs to be low in height so that it does not interfere with the leader-pin pulling-out mechanism, and the mounting boss also cannot be made high from the viewpoint of the metal-mold strength described above. Therefore, there is a possibility that problems associated with the aforementioned tilting may arise.

[0009]

The present invention has been made in view of the points mentioned above. Accordingly, an object of the present invention is to provide a magnetic tape cartridge which is capable of holding the leader pin in a satisfactory manner by improving the manufacturing precision, mounting performance, etc., of the spring member which detachably holds the leader pin.

[0010]

[Means Used to Solve the Problems]

There is provided a magnetic tape cartridge comprising (1) a single reel with magnetic tape wound thereon; (2) a cartridge case, which comprises an upper case and a lower case, for rotatably housing the single reel; (3) a leader pin firmly attached to a leading end of the magnetic tape to pull the magnetic tape out of the cartridge case; and (4) a lock member, formed from a plate spring, for detachably locking and holding an upper end portion and a lower end portion of the leader pin to the cartridge case; wherein the lock member comprises a plate-shaped mounting portion which is held by the upper and lower cases, and elastic arm portions extending from the mounting portion toward the leader pin, the upper and lower pin-locking portions of the elastic arms being engageable with said leader pin at the upper and lower end portions of the leader pin side of said mounting portion; and wherein an interior angle that the mounting portion forms with the elastic arm portion is an obtuse angle.

[0011]

The interior angle that the mounting portion of the aforementioned lock member forms with the elastic arm portion of same is preferably 135° or greater.

[0012]

Further, an alternate embodiment of the magnetic tape cartridge is characterized by a lock member, formed from a plate spring, for detachably locking and holding an upper end portion and a lower end portion of the leader pin to the cartridge case; wherein the lock member comprises a plate-shaped mounting portion

which is held by the upper and lower cases, and elastic arm portions extending from the mounting portion toward the leader pin, the upper and lower pin-locking portions of the elastic arms being engageable with said leader pin at the upper and lower end portions of the leader pin side of said mounting portion; and wherein the upper and lower spring type lock-member installing portions hold the lock member in said cartridge case at positions away from side walls of the lower and upper cases to the inside. It is preferable from the viewpoint of metal-mold strength that the upper and lower lock-member installing portions be formed at positions 0.4 mm or greater away from the side walls of the lower and upper cases.

[0013]

In this case, it is preferable that said lock member be provided with said upper and lower engagement recesses held at the position by fitting said upper and lower protrusions which is provided with the lock-member installing portions at the upper and lower end portion of the mounting portion, and that longitudinal positioning of the mounting portion is performed.

[0014]

In addition, it is preferable that the lock-member installing portion of said cartridge case be provided with inclined surfaces for guiding the lock member to the protrusion. It is also preferable that the lock member be provided with guide portions at an insertion corner portion of the upper and lower engagement recesses. By this structure, the engagement between the lock

member and the lock-member installing portion can be facilitated.

[0015]

On the other hand, in the alternate embodiment of the magnetic tape cartridge of the present invention, it is preferable that the upper and lower lock-member installing portions have a tilt regulating portion for holding an edge, opposite from the elastic arm portions, of the mounting portion of the lock member in an erect posture. By this structure, tilting of the lock member can be prevented.

10 [0016]

Note that when the lock member such as that described above is assembled into the cartridge case, the upper and lower cases of the cartridge case can be fastened together by tightening small screws inserted in holes formed in the upper case. In this case, the lock member is installed in the lower case. After the upper case is stacked on the lower case, they are assembled without inverting the cartridge case up and down. By this method, the assembly operation can be efficiently performed.

[0017]

20 [Advantageous Effects of the Invention]

According to the magnetic tape cartridge of the present invention as described above, which is provided with elastic arm portions extending from said mounting portion toward said leaderpin, the upper and lower pin-locking portions of the elastic arms being engageable with said leader pin at said upper and lower end portions of said the leader pin side of said plate-shaped

mounting portion, an interior angle that the mounting portion
of the lock member formed from plate spring forms with the elastic
arm portion of the lock member is an obtuse angle. Therefore,
deep curve pressing is unnecessary, manufacturing precision is
5 enhanced, and the amount of deformation in pressing and holding
the leader pin becomes constant and therefore stable leader-pin
locking force is obtained. In addition, the pressing operation
becomes easy and manufacturing steps are simplified. The length
of the elastic arm portion is short, so the developed area is
10 reduced and costs are decreased. Furthermore, even if a large
number of lock members are stored, they are less likely to engage
each other and can be serially fed by a part feeder.

[0018]

According to an alternate embodiment of the magnetic tape
15 cartridge of the present invention, the upper and lower spring
type lock-member installing portions, which hold the lock member
formed from the plate spring, provided with a plate-shaped
mounting portion and elastic arm portions extending from the
upper and lower end portions of the mounting portion toward the
20 leaderpin in the cartridge case, hold the lock member as described
above at positions away from side walls of the lower and upper
cases to the inside. Therefore, even if the lock member is made
thin, that part of the metal mold which molds the wall surface
of the cartridge case will not become thin and therefore the
25 metal mold can be easily manufactured and damage to the metal
mold can be prevented.

[0019]

If engagement recesses for fitting the protrusions of the spring type lock-member installing portion are provided in the upper and lower edges of the mounting portion of said lock member, longitudinal positioning of the lock member can be simultaneously performed and therefore the accuracy of position between the lock member and the leader pin can be enhanced.

[0020]

Furthermore, if the tilt regulating portion for holding the end portion of the lock member in an erect posture is provided in said spring type lock-member installing portion of said cartridge case, tilting of the lock member can be prevented, for example, when the lock member is installed in the lower case and the upper case is stacked on the lower case, while assuring a space for a leader-pin pulling-out mechanism of a drive unit. Thus, satisfactory assembly performance can be assured.

[0021]

If screw holes are formed in the top surface of the upper case so that assembly can be performed without inverting the cartridge case up and down, assembly performance is further enhanced.

[0022]

[Description of the Preferred Embodiment]

The present invention will be described in detail, in accordance with the embodiments shown in the drawings. Fig. 1 is an exploded perspective view of a magnetic tape cartridge

in accordance with one of the embodiments of the present invention,
Fig. 2 is a front view of the vicinity of an opening with a slide
door in the open state and Fig. 3 is an A-A sectional plan view
of Fig. 2. Additionally, Fig. 4 is a perspective view of a locking
5 member and Fig. 5 and 6 are sectional views of a spring type
lock-member installing portion taken along line B-B and C-C of
FIG. 3.

[0023]

The magnetic tape cartridge 1 has a cartridge case 4, which
10 is formed by fastening an upper case 2 and a lower case 3 together
with small screws or the like. Within the cartridge case 4, a
single reel 7 with magnetic tape 6 wound thereon is rotatably
housed. The leading end portion of the magnetic tape 6 is affixed
to a leader pin 5. The upper and lower cases 2 and 3 have side
15 walls in which an opening 10 is formed to pull the magnetic tape
6 out of the cartridge case 4. A grooved door rail 12 (shown
in Fig. 3), in which a slide door 11 slides to be opened and
shut is formed near the opening 10. The slide door 11 is urged
closed by elastic means (not shown).

20 [0024]

During non-use of the magnetic tape cartridge 1, the upper
and lower ends of the leader pin 5 affixed to the leading end
of the magnetic tape 6 are held in upper and lower housing recesses
20 formed near the opening 10, with the magnetic tape 6 completely
25 wound on the reel 7. The upper and lower housing recesses 20
are continuous to upper and lower insertion guide portions (guide

surfaces) 21, which are formed into lead-in structure toward the opening 10 so that the upper and lower ends of the leader pin 5 can be guided to deep portion of the upper and lower housing recesses 20.

5 [0025]

The leader pin 5 is held and pulled in by a drive unit of a recording-reproducing apparatus, which uses the magnetic tape cartridge 1, so that the magnetic tape 6 is introduced into a tape traveling path within the recording-reproducing apparatus. Also, a lock member 9 consisting of a plate spring is installed to detachably hold the upper and lower end portions of the leader pin 5 in the upper and lower housing recesses 20.

[0026]

As illustrated in Figs. 2 and 3, the leader pin 5 has a tape clamp shaft portion 5a at its central portion. The leading end portion of the magnetic tape 6 is wound on the tape clamp portion 5a and is clamped by fitting a C cross-section clamp member 5e onto the tape clamp portion 5a. The leader pin 5 also has upper and lower flange portions 5b, 5b at the upper and lower ends of the tape clamp portion 5a and further has narrow engagement portions 5c, 5c outside the plate-shaped upper and lower flange portions 5b, 5b. The engagement portions 5c, 5c are formed at upper and lower portions of upper and lower flange portions 5b to extend axially to be engaged and held by the recording-reproducing apparatus. Furthermore, the leader pin 5 has locking portions 5d, 5d for locking the cartridge case at the

upper and lower ends thereof. This leader pin 5 is formed, for example, by cutting a shaft of metal such as stainless steel, etc., and the length of the tape clamp portion 5a equals the width of the magnetic tape 6.

5 [0027]

The clamp member 5e is molded from resin and has an axial length equivalent to the length of the tape clamp portion 5a of the leader pin 5. The clamp member 5e is formed into a C-shape in cross section and provided with a slit extending axially over
10 the overall length. The clamp member 5e is elastically fitted on the outer periphery of the tape clamp portion 5a of the leader pin 5 through the axial slit.

[0028]

In Fig. 1, the upper and lower cases 2, 3 are formed into
15 a generally rectangular shape and provided with side walls 2b, 3b along the perimeters of the top wall 2a and the bottom wall 3a. The upper and lower cases 2, 3 are further provided with arc-shaped inner walls 3c (arc-shaped inner walls for the upper case 2 are not shown) along the outer periphery of the reel 7.
20 The lower case 3 has four boss portions 3d (a boss portion 3d near the opening 10 is hidden behind the slide door 11) between the side walls 3b and the inner walls 3c. Similarly, the upper case 2 has four boss portions (not shown). The lower case 3 is fastened to the upper case 2 by abutting the boss portions 3d
25 of the lower case 3 with the boss portions of the upper case 2 and then tightening small screws through the bottom surface

of the lower case 3. Note that tightening of the small screws with respect to the boss portions 3d may be performed through the top surface of the upper case 2, as described later.

[0029]

5 The center portion of the lower case 3 also has a center hole 3e so that the reel 7 can be driven by a driving shaft of the aforementioned drive unit. A write protector member 13 for preventing writing is slidably disposed in the rear end portion of the cartridge case 4. The center portion of the reel 7 is
10 provided with a rotation regulating mechanism 15 for restricting rotation of the reel 7 during non-use of the magnetic tape cartridge 1.

[0030]

15 In addition to the above, although not shown, the reel 7 includes a reel plate mounted on the central portion of the bottom surface thereof, the reel plate being used for attracting and holding magnetic tape rotation means. The radially outer portion of the bottom surface of the reel 7 has a reel gear that meshes with the driving gear of the rotation means. If the reel gear
20 and the driving gear mesh with each other, the rotation regulating mechanism 15 performs an unlocking operation and frees the reel 7 to rotate.

[0031]

25 Next, a description will be given of the lock member 9 for holding the upper and lower end portions of the leader pin 5 in the upper and lower housing recesses 20, and the structure

for mounting said lock member 9.

[0032]

The lock member 9 has a plate-shaped mounting portion 9a in the form of a generally rectangular plate. With the upper case 2 and the lower case 3 stacked together, the mounting portion 9a is engaged and held by upper and lower lock-member installing portions 30, which are provided near the side walls 2b, 3b of the upper and lower cases 2, 3. Note that although only the lower lock-member installing portion 30 of the lower case 3 is shown, the upper lock-member installing portion 30 of the upper case 2 is symmetrical in shape with the lower lock-member installing portion 30. The lock member 9 also has a pair of elastic upper and lower arm portions 9b extending obliquely from the upper and lower end portions of the mounting portion 9a toward the leader pin 5. The elastic upper and lower arm portions 9b have upper and lower pin-locking portions 9c at their outer ends, respectively. The upper and lower pin-locking portions 9c of elastic arm portions 9b abut the outer peripheries of the upper and lower locking portions 5d of the leader pin 5, respectively. Each pin-locking portion 9c is bent so that it projects toward the leader pin 5. If the leader pin 5 is inserted through the opening 10, the leader pin 5 is brought into contact with the outer inclined surface of the bent portion of each pin-locking portion 9c, and each elastic arm portion 9b is elastically deformed. As a result, the upper and lower locking portions 5d of the leader pin 5 are pressed against and held within the upper and lower

housing recesses 20 by the inner inclined surfaces of the bent portions of the upper and lower pin-locking portions 9c.

Furthermore, the top and bottom edges of the mounting portion 9a of the lock member 9 are provided with upper and lower engagement recesses 9d.

[0033]

An interior angle β (see Fig. 4) that the mounting portion 9a forms with the bent elastic arm portion 9b is formed as an obtuse angle, preferably 135° or greater. In relation to the length of the elastic arm portion 9b, etc., the lock member 9 is as thin as 0.2 to 0.3 mm in order to obtain an appropriate leader-pin locking force. Note that a lock member 50 shown in Fig. 13 is about 0.4 mm in thickness. Also, the upper and lower elastic arm portions 9b, 9b may be provided so that they are connected at their proximal portions.

[0034]

The upper and lower lock-member installing portions 30 of the upper and lower cases 2, 3, which hold the lock member 9, are provided so that they hold the lock member 9 at positions away from the side walls 2b, 3b of the upper and lower cases 2, 3, preferably at positions 0.4 mm or more away from the side walls 2b, 3b from the standpoint of metal-mold strength.

[0035]

The lower lock-member installing portion 30 is equipped with a first support portion 31, and a second support portion 32 facing the first support portion 31. The first support portion 31 is

formed integrally with the side wall 3b of the lower case 3 and projected in the form of a flat plate from the side wall 3b. The second support portion 32 is projected from the bottom wall 3a of the lower case 3. The amount that the first support member 31 projects from the side wall 3b is set to the dimension of the aforementioned hold position. The gap between the first support portion 31 and the second support portion 32 is formed to the thickness of the mounting portion 9a of the lock member 9 or greater. The mounting portion 9a of the lock member 9 is inserted into the gap between the first support portion 31 and the second support portion 32.

[0036]

The second support portion 32 is narrower in width than the first support portion 31 but higher in height than the first support portion 31. The top surfaces of the first support portion 31 and the second support portion 32 are formed into inclined surfaces 31a, 32a (see Fig. 5) which become lower in height toward the gap therebetween. The lower end portion of the lock member 9 is guided to the gap between the first and second support portions 31 and 32 by the inclined surfaces 31a, 32a.

[0037]

Between the first support portion 31 and the second support portion 32, a lower protrusion 33 (see Fig. 6) is formed so that it protrudes from the bottom surface 3a of the lower case 3. The longitudinal width of the lower protrusion 33 is narrower than the width of the second support portion 32 of the lock-member

installing portion 30. Across the protrusion 33, there are formed front and rear gaps into which the lock member 9 is inserted. The width of the lower protrusion 33 equals the width of the engagement recess 9d in the lower edge of the mounting portion 9a of the lock member 9 so that the engagement recess 9d is fitted on the protrusion 33. Furthermore, the protrusion 33 has inclined guide surfaces 33a at the top edge thereof. Similarly, the both corner portions of the engagement recess 9d of the lock member 9 were cut at a tilt to form inclined guide portions 9e so that the engagement recess 9d is easily fitted on the protrusion 33.

[0038]

With the mounting structure mentioned above, as shown in Figs. 5 and 6, the lower engagement recess 9d in the mounting portion 9a of the lock member 9 is easily fitted on the lower protrusion 33 between the first support portion 31 and the second support portion 32 of the spring type lower lock-member installing portion 30 of the lower case 3, while the lower engagement recess 9d is being guided by the inclined surfaces 31a, 32a, 33a and the guide portions 9e. After other components, such as the reel 7, etc., are assembled within the lower case 3, the upper case 2 is stacked on the lower case 3 so that the upper lock-member installing portion 30 of the upper case 2 engages with the mounting portion 9a of the lock member 9. With the upper case 2 and the lower case 3 stacked together, they are assembled by tightening small screws.

[0039]

In assembling the upper case 2 and the lower case 3, the upper case 2 and the lower case 3 are vertically positioned by the spring type lock-member installing portions 30 and longitudinally positioned by engagement between each protrusion 33 and each engagement recess 9d. As a result, the contact positions between the upper and lower pin-locking portions 9e of the lock member 9 and leader pin 5 are assured.

[0040]

Note that the first support portion 31 of the spring type lock-member installing portion 30 may be formed by non-continuous separate support portions, as shown in Fig. 7. This structure is advantageous from the viewpoint of metal-mold strength.

[0041]

Figs. 8 and 9 illustrate a magnetic tape cartridge constructed according to an alternate embodiment of the present invention. The lock member 9 is formed in the same way as the aforementioned embodiments, but the spring type lock-member installing portion 30 differs in construction from the spring type lock-member installing portion 30 described above.

[0042]

The lower spring type lock-member installing portion 30 of the lower case 3, as in the case described above, has the first support portion 31, the second support portion 32, and the protrusion 33. The spring type lock-member installing portion 30 further has a tilt regulating portion 34 on the end portion of the depth side of the first support portion 31. The tilt

regulating portion 34 is used for holding the edge, opposite from the elastic arm portion 9b, in the mounting portion 9a of the lock member 9 in an erect posture. The upper spring type lock-member installing portion 30 of the upper case 2 similarly
5 has the first support portion 31, the second support portion 32, and the protrusion 33, but does not have the tilt regulating portion 34.

[0043]

The tilt regulating portion 34 extends vertically in the form
10 of a rib and is formed higher than the first support portion 31 and the second support portion 32. The interior surface of the tilt regulating portion 34 extends upward so that a tilt regulating gap equivalent to the thickness of the lock member 9 is formed between the interior surface and the first support
15 portion 31, and holds the lock member 9 vertically. The tilt regulating portion 34 has an inclined guide face 34a at its top end.

[0044]

In this alternate embodiment, when the lock member 9 is
20 installed in the lock-member installing portion 30 of the lower case 3, tilting of the lock member 9, particularly tilting toward the inside of the case, is regulated by the tilt regulating portion 34. Therefore, the engagement of the lock member 9 with the lock-member installing portion 30 of the upper case 2 in stacking
25 the upper case 2 on the lower case 3 is performed with reliability, and the workability is enhanced.

[0045]

Figs. 10 and 11 illustrate a modification of the alternate embodiment. The first support portion 31 of the lock-member installing portion 30 in Figs. 8 and 9 are divided into
5 non-continuous separate support portions. Particularly, the first support portions 31 of the lower case 3 are disposed at positions away from the tilt regulating portion 34. This structure has an advantage of assuring metal-mold strength when molding the support portions 31.

10 [0046]

In the aforementioned embodiments, the lower case 3 is first placed with the top upward. Then, the lower end of the lock member 9 is inserted into the lock-member installing portion 30 of the lower case 3. Next, the upper case 2 is stacked on the lower
15 case 3. However, conversely, with the upper case 2 upward, the lock member 9 may be installed and the lower case 3 stacked on the upper case 2. In this case the tilt regulating portion 34 needs to be provided in the upper case 2.

[0047]

20 Also, in the case where the lock member 9 is installed in the lower case 3 having screw holes in the bottom surface thereof, the lower case 3 is placed with the top upward and then the upper case 2 is stacked on the lower case 3. After that, the cartridge case 4 is inverted up and down, and small screws are tightened.
25 However, if the upper case 2 has screw holes in the top surface, small screws can be tightened without inverting the cartridge

case 4 up and down and the assembly step can be simplified. Therefore, it is preferable to provide screw holes according to an assembly step.

[Brief Description of the Drawings]

5 FIG. 1 is an exploded perspective view of a magnetic tape cartridge according to one of the embodiments of the present invention;

 FIG. 2 is a front view of vicinity of opening showing that the slide door in the open state;

10 FIG. 3 is an A-A sectional plan view of Fig.2;

 FIG. 4 is a perspective view of a locking member;

 FIG. 5 is a sectional view of a lock-member installing portion taken substantially along line B-B of FIG. 3;

 FIG. 6 is a sectional view of the lock-member installing
15 portion taken substantially along line C-C of FIG. 3;

 FIG. 7 is a sectional view of a modification of the lock-member installing portion according to an alternate embodiment of FIG. 6;

 FIG. 8 is a plan view of a magnetic tape cartridge
20 according to an alternate embodiment of the present invention, the upper case of the cartridge having been removed to show components near the opening of the cartridge;

 FIG. 9 is a fragmentary perspective view showing the state in which the lock member of FIG. 8 is installed;

25 FIG. 10 is a plan view of a modification of the magnetic tape cartridge shown in FIG. 8, the upper case of the cartridge

having been removed to show components near the opening of the cartridge;

FIG. 11 is a fragmentary perspective view showing the state in which the lock member of FIG. 10 is installed;

5 FIG. 12 is a plan view of a conventional magnetic tape cartridge, the upper case of the cartridge having been removed to show components near the opening of the cartridge; and

FIG. 13 is a perspective view showing the lock member of FIG. 12.

10 [Explanation of the Reference Numerals]

- | | | |
|----|---------|-------------------------------------|
| | 1. | Magnetic tape cartridge |
| | 2. | Upper case |
| | 3. | Lower case |
| | 2b, 3b | Side wall |
| 15 | 4. | Cartridge case |
| | 5. | Leader pin |
| | 6. | Magnetic tape |
| | 7. | Reel |
| | 9. | Lock member |
| 20 | 9a. | Mounting portion |
| | 9b. | Arm portion |
| | 9c. | Upper and lower pin-locking portion |
| | 9d. | Engagement recess |
| | 9e. | Guide portion |
| 25 | β | Interior angel |
| | 10. | Opening |

- 20. Housing recess
- 30. Lock-member installing portion
- 31. First support portion
- 32. Second support portion
- 5 33. Protrusion
- 34. Tilt regulating portion
- 31a.32a.33a Inclined surface
- 34a Guide face

FIG.1

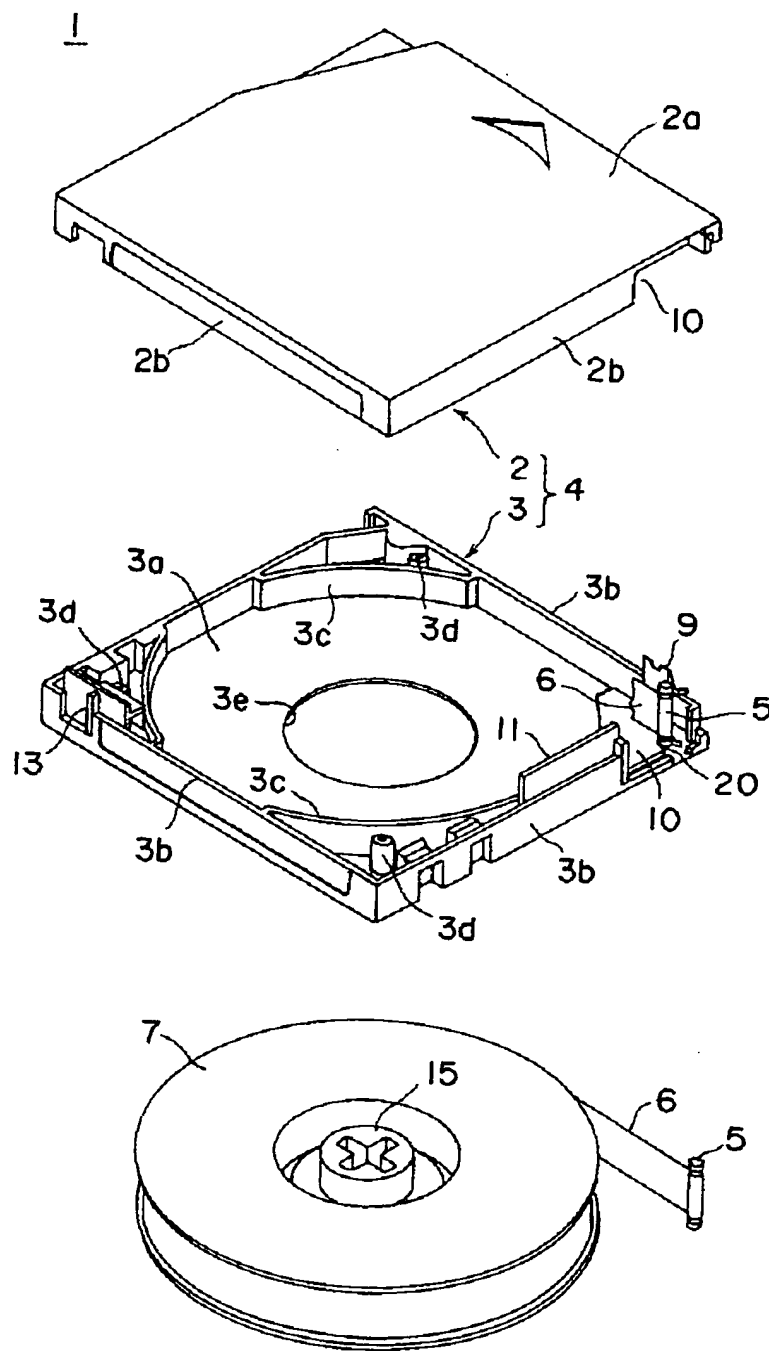


FIG. 4

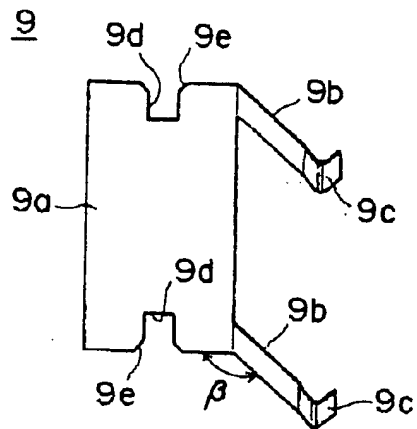


FIG. 5

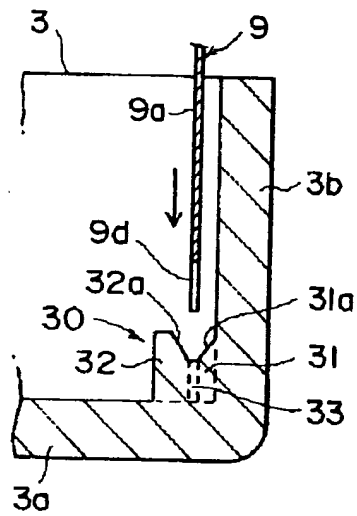


FIG. 6

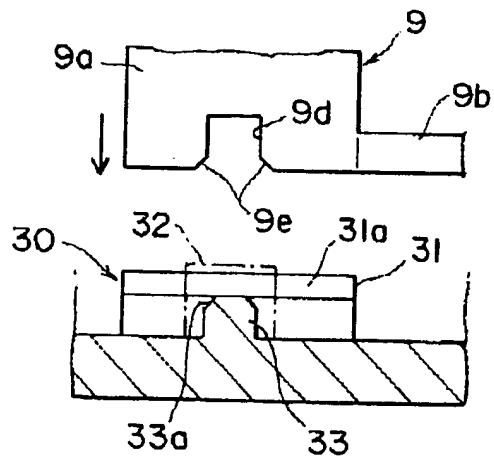


FIG. 7

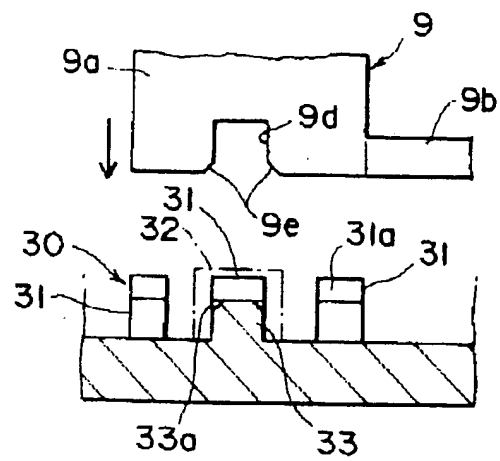


FIG. 8

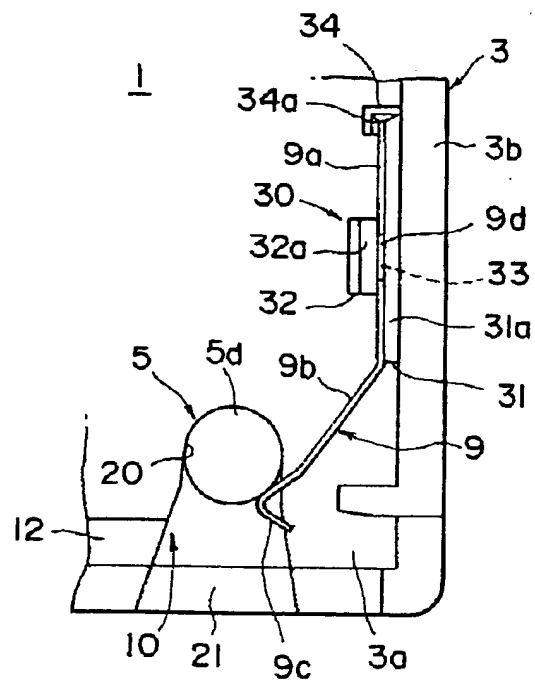


FIG. 9

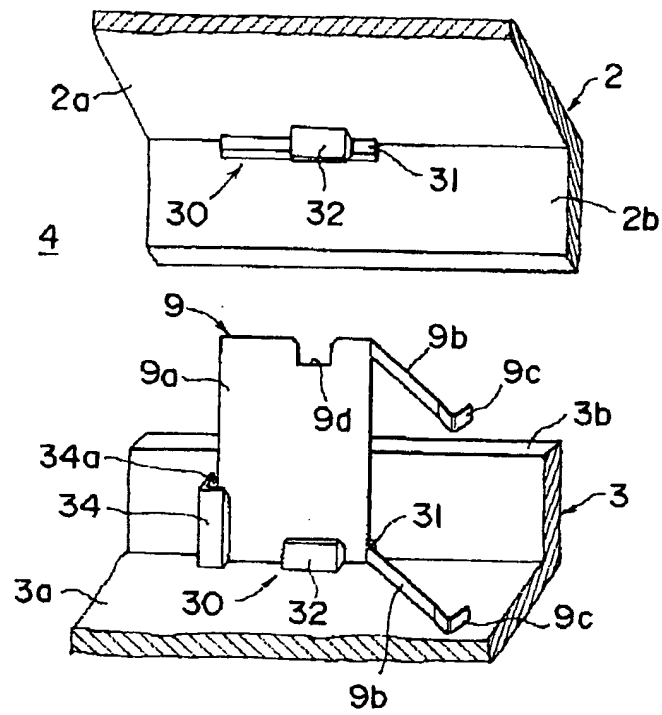


FIG. 10

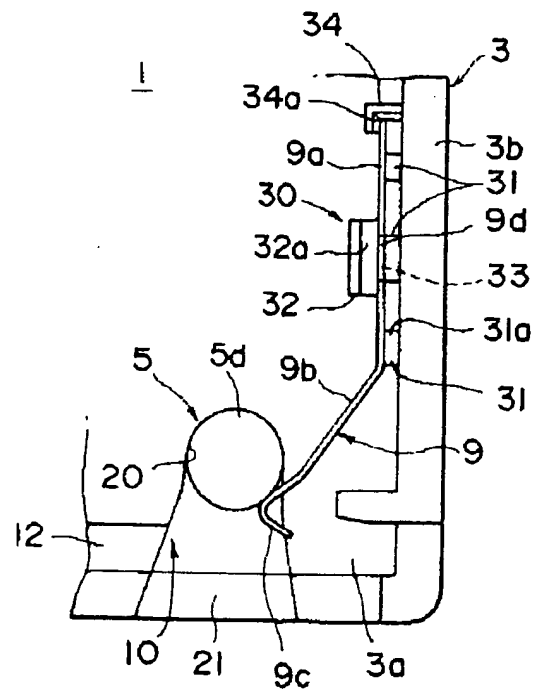


Fig. 4 is a perspective view of the device 4, showing the top surface 2a and side surface 2b. The device includes a central component 32 flanked by two smaller components 31, all mounted on a base 30.

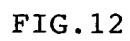
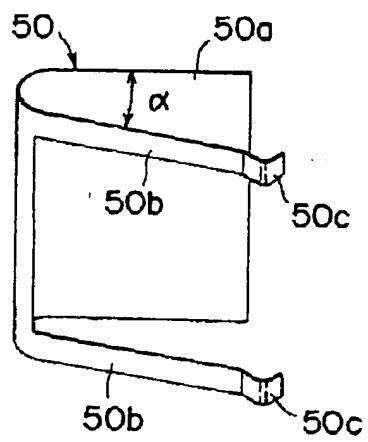


FIG.13



[Name of Document] ABSTRACT

[Abstract]

[Objective]

5 To provide a magnetic tape cartridge which is capable of
holding the leader pin in a satisfactory manner by improving
the manufacturing precision, mounting performance, etc., of the
spring member which detachably holds the leader pin.

[Constitution]

10 There is provided a magnetic tape cartridge comprising a single
reel 7 with magnetic tape 6 wound thereon, a cartridge case 4
for rotatably housing the single reel 7 and a lock member 9 for
detachably locking and holding an upper end portion and a lower
end portion of the leader pin 5 affixed to a leading end of the
magnetic tape 6 to the cartridge case 2, 3; wherein the lock
15 member 9 is provided with a plate-shaped mounting portion 9a
and an elastic arm portion 9b bending from the mounting portion
9a so that its upper and lower pin-locking portions 9c is engageable
with the leader pin 5; and wherein an interior angle that the
mounting portion 9a forms with the elastic arm portion 9b is
20 an obtuse angle.

[Selected Figures] Figure 3